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(54) Loom stop motion

(57) A loom stop motion is effective to bring the loom to a halt at different points in the loom cycle according to whether a warp or weft defect sensor is actuated. When a warp solenoid 10' or a weft solenoid 10 is actuated by defect, respective rods 16' or 16 are raised to bring daggers 22', 22 into the paths of cam operated abutments 30', 30 so that a slide 18 moves a rod 56 to knock-off the shipper handle 59 to stop the loom. The cam positions are adjustable on the shaft so that the shipper handle is knocked-off at different points in the loom cycle corresponding to the type of defect. A circuit providing single cycle operating facility is provided.

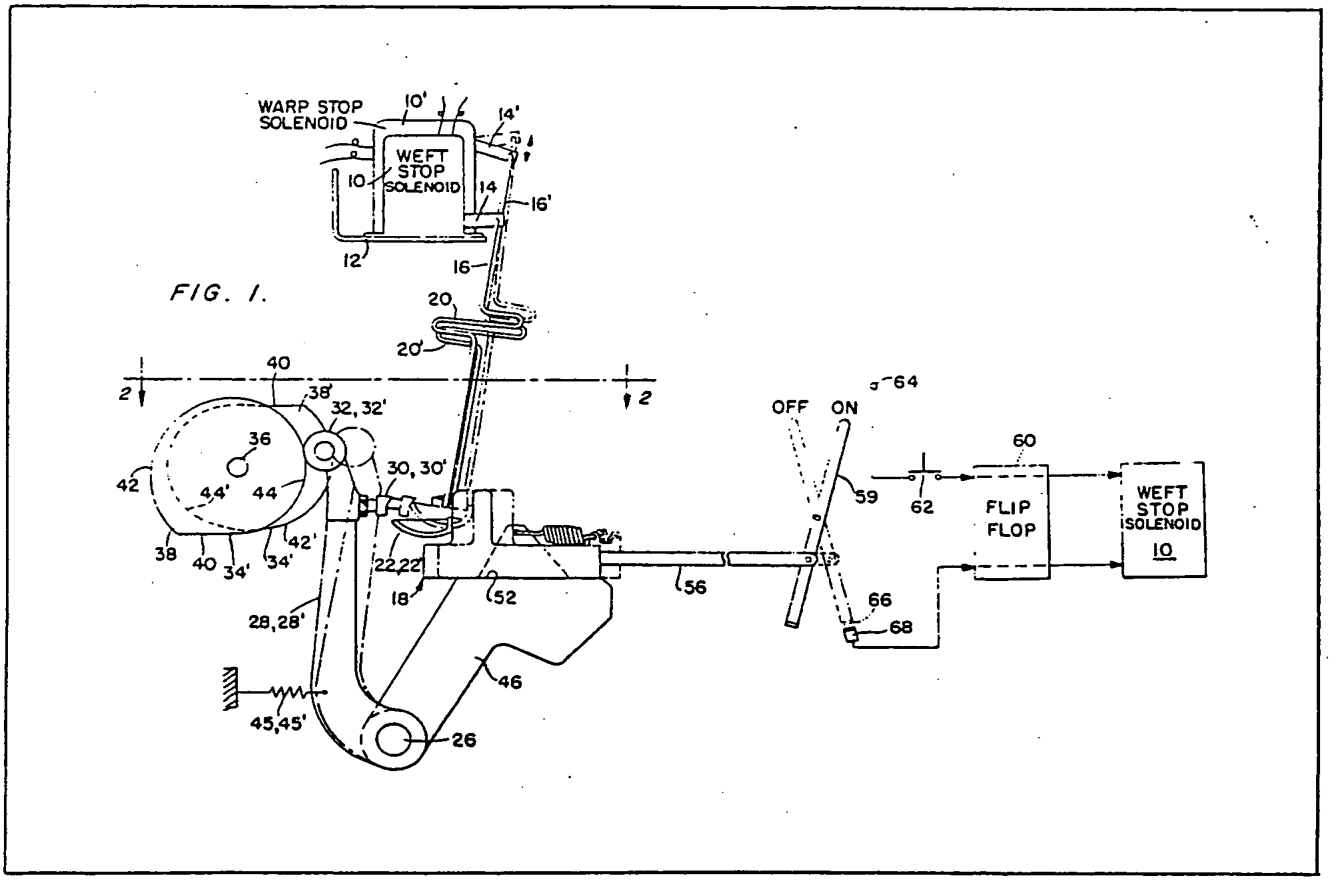

FIG. 1.

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

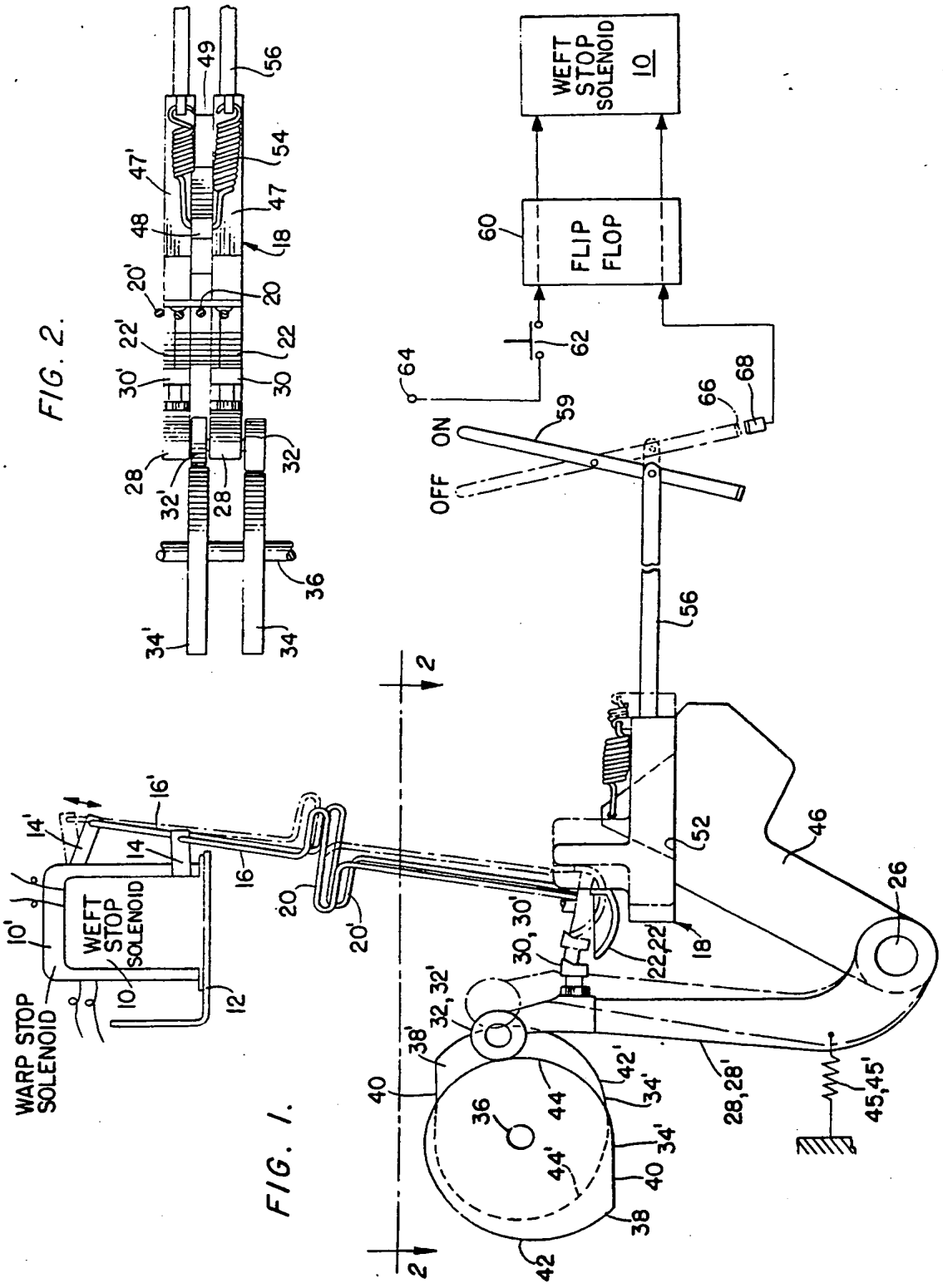

FIG. 2.

FIG. 1.

SPECIFICATION

Loom stop motion

This invention relates to the field of loom stop motions and is concerned more particularly with a combined warp and weft loom stop motion which can be selectively timed so as to halt the loom in the event of yarn breakage at different points in its operating cycle dependent upon whether the breakage is of a weft or warp yarn, the stopping points being selected to facilitate repair of the particular breakage.

Looms for weaving cloth have for many years been conventionally equipped with stop motions for detecting breakage or other loss of tension in any of the warp threads as well as the breakage or failure for other reasons to insert a filling thread into the shed of the loom defined between opposed groups of warp threads. While these stop motions can take various forms, they are usually designed to close electrical contacts when any warp or filling thread breaks and thereby emit a control signal which is utilized to stop or "knock-off" the mechanical drive of the loom.

Ideally, warp and filling breakages have different requirements as regards the point in the operative cycle of the loom at which the breakage or other defect causing the stoppage can be repaired. The warp threads, of course, pass through the eyes of the needles, which are shifted up and down to separate the groups of warp threads and form the weaving shed, and since any broken warp thread must be rethreaded through its corresponding heddle eye, it obviously will be easier to accomplish such rethreading when the heddles are in or near their closed position, and their eyes are substantially aligned with the median plane of the warp, rather than when the heddles are open or separated and the warp threads are stretched apart. Thus, the optimum stopping position for repairing a warp thread breakage is with the lay of the loom approaching front dead center but not so close to be front dead center that the weft thread would be beaten up into the fabric, say at about 320° of the loom cycle starting from front dead center.

Contrariwide, the filling thread is inserted into the shed while the warp groups defining the shed are well separated apart and removal of a broken weft thread can most easily be carried out when the shed is reasonably open. Once the shed begins to close, as the heddles move together, the warp threads begin to grip the incomplete weft thread which makes its removal much more difficult. Thus, the optimum position of the loom for purposes of repair of a filling defect is then the lay of the loom is adjacent to back dead center.

The stopping position of the loom, particularly in case of warp breakage, must also take into account the avoidance of so-called "set-marks" in the woven fabric. If the lay of the loom is allowed to stop too near front dead center and the loom is again started at that point, the portion of the cycle remaining until front dead center is too short for the lay to build up to its normal operating speed and momentum and thus as the lay reaches front dead center, the reed carried thereby will impact against the last inserted weft thread with a force less than normal. This difference in beat-up force will appear in the fabric and cause what is referred to as a "set-mark". Traditionally, the practice in the art has been for the loom attendant to rotate the crankshaft of the loom backwards by hand, using a large wheel provided at one end of the crankshaft for this purpose, so as to relocate the lay and other operative components at a starting position effective to avoid the set-mark problem.

In addition, there exist certain circumstances under which it becomes desirable to have the loom insert a single pick and then be brought to a halt. Single-pick operation is useful, for example, in facilitating the repair of a defective pick in automatically positioning the loom on signal in position to enable the repair to be corrected with a minimum of difficulty. In the past, "single-pick" operation has been carried out under the control of the operator, who if need be rolls back the loom crankshaft to the appropriate starting position and then operates the loom to insert a single pick or weft by direct maniplation of the loom operating handle.

In accordance with the present invention there is provided a method of weaving a fabric in which a loom is driven in a repetitive cycle to insert a weft yarn between separated groups of warp yarns to form the fabric, which comprises deriving signals on breakage of the weft yarn or any of the warp yarns from transducer means responsive to said breakages and applying said signals to stop said loom at such times that said loom is stopped in different positions for warp and weft breakages.

Further in accordance with the present invention there is provided, in a yarn stop motion for a loom having a driving means for driving the same in a repetitive cycle to insert a weft yarn between separated groups of warp yarns to form fabric and including separate detection means for detecting the occurrance of a breakage in the weft yarn or in any of the warp yarns, an improved combined warp and filling stop motion effective to stop the loom drive in different positions within its cycle corresponding to the type of yarn breakage, which comprises:

— a pair of impacting means each mounted for independent movement to and fro along a fixed path;

— separate drive means for the respective impacting means, each such drive means being driven from said loom driving means in individually adjustable predetermined timed relation to the loom cycle;

— loom control means operatively connected to the loom drive means and movable between a normal loom running position and a loom stopping position;

— impact transmitting means operatively associated with said control means and displaceable between a retracted position outside the paths of both said impacting means to a projected position within both said paths to

receive when in said projected position the impact of the respective impacting means and transmit such impact to said control means to move the same to its loom stopping position; and

— separate actuating means for said impact transmitting means responsive to each of said weft detecting means to cause displacement of said impact transmitting means to its projected position in the event of the activation of the corresponding detecting means, whereby the response of the combined stop motion to either warp or weft breakage is delayed according to the predetermined timing of the corresponding drive means for a period which can be adjusted to cause stoppage of the loom at different positions for the two types of yarn breakage.

The simple stopping arrangement of the present invention is responsive to both warp and filling breakages and is capable in the event of either such breakage of automatically bringing the loom to a halt in a condition optimally suited to the correction of the particular breakage. It may be selectively adjustable to cause stoppage of the loom in different positions according to the type of defect which occurs. It can be utilized for achieving automatic single pick operation.

The following description in which reference is made to the accompanying drawings is given in order to illustrate the invention.

In the drawings:

Fig. 1 is a side elevation in somewhat diagrammatic form of one embodiment of the combined stop motion of the present invention in operative position, and

Fig. 2 is a plan view looking down substantially along line 2—2 of Fig. 1.

In Fig. 1, the combined stop motion of the present invention is seen in side elevation in operative position mounted on the loom, with, however, only those components of the loom which are directly associated with the invention; namely, the crankshaft and operating handle, being shown as is necessary for following this description. In Fig. 1, a pair of control solenoid housings 10, 10′ are mounted on a bracket 12 which is fixed to a convenient stationary part of the loom (not shown). One of these solenoids 10 is wired to receive the control signals from a weft or filling breakage detecting means while the other 10′ is wired to receive the control signals from a warp breakage detector means, neither detecting means being shown. The construction and operation of these detecting means have no significant bearing on either the structure or operation of the present invention and they can, accordingly, be of any of the conventional detection systems used for this purpose, the only requirement being that they initiate and deliver separate control pulses when a weft or a warp breakage, respectively, occurs. Each of the stop solenoids 10, 10′ has its armature (not seen) connected to an exteriorly projecting operating lever 14, 14′ so that upon energization of either solenoid 10, 10′, the corresponding operating lever is rocked upwardly and remains so until the solenoid is de-energized to return the lever to its starting position.

At its free end, each of operating levers 14, 14′ has a connecting wire 16, 16′ pivoted thereto which extend generally vertically downwardly in more or less parallel relation to a common "knock-off" head 18. Since the distance between the points of connections of the lower ends of wires 16, 16′ may vary in practice, preferably each connecting wire includes a serpentine section, as at 20, 20′ which can be easily bent to make the rods longer or shorter as circumstances may dictate.

Mounted at the left-hand end of the common "knock-off" head 18 for limited pivotal movement relative thereto between a generally horizontal position and an upwardly tilted position (shown in dotted lines) are a pair of knock-off fingers 22, 22′ which are disposed in spaced parallel relation to one another in the dimension perpendicular to the plane of Fig. 1, as is evident in the plan view of Fig. 2. The shape of fingers 22, 22′ is not of particular importance, the only requirements being that they have adequate strength to withstand substantial mechanical impact applied against their extreme outward ends. To this end, the fingers, as seen in the drawings, can be given a roughly dish-shape, with one side edge extending flange-like vertically as at 23, 23′ for improved resistance to bending in both planes. The flange edges 23, 23′ can serve as a convenient point for engagement with the lower ends of wires 16, 16′, each such edge being perforated for engagement with hooks bent for that purpose in the lower wire ends.

A supporting stub shaft 26 is affixed to a pair of the loom frame (not shown) and on shaft 26 are pivoted a pair of identical rocker arms 28, 28′ extending generally vertically upwardly from the axis of shaft 26 in axially spaced apart relation, again best seen in Fig. 2. At their upper ends, each rocker arm 28, 28′ carries a follower roller 30, 30′ thereon and intermediate their ends, each arm carries a rightwardly projecting hammer 30, 30′. The axes of the hammers and knock-off fingers are so related that they lie in pairs, one hammer and one finger, in generally common planes in one direction (the vertical direction, as appears in Fig. 2). In the other direction (i.e., as shown) axes of the respective pairs of hammers and fingers are offset or separated so as to be out of registration when the knock-off fingers are actuated in the solid line position seen in Fig. 1 but are in registration when the fingers are situated in the dotted line upwardly displaced position. The front ends of the hammers are preferably notched or otherwise contoured for non-slipping engagement with the ends of fingers 22, 22′.

Each of the follower rollers 32, 32′ rides on the peripheral surface of a corresponding cam 34, 34′ mounted in axially spaced relation on the crankshaft of the loom 36 for rotation therewith. The cams 34, 34′ are identically contoured so as to each provide a high region or lobe 38, 38′ at one point thereon which is proceeded by a ramp

40, 40′ and followed by a gradually tapering transition 42, 42′ which merges into a low region 44, 44′ equal to about 180° of the cam periphery. While the cam contours are preferably the same, they are arranged in out of phase relationship on the loom crankshaft so that the respective lobes thereof move into contact with the corresponding follower rollers at different points on the loom cycle. The rocker arms are biased into contact with the cam peripheries, as by springs 45, 45′ and the starting positions of the cams on the crankshaft can be adjusted individually by means of set screws or the like (not shown).

In general, the geometry of the cams in relation to the followers, rocker arms and knock-off hammers is such as to cause each rocker arm and associated hammer to pivot between a retracted position spaced away from, i.e., leftwardly in Fig. 1, the extreme tip of its associated knock-off finger when the follower roller rides on the low section 44, 44′ of the cam, and a projected operative position in which the knock-off hammer overlies its corresponding knock-off finger, as the latter is in full line position, when the follower roller makes contact with the high portion or lobe 38, 38′ of the cam.

The knock-off head 18 is supported for horizontal reciprocating movement on a guide bracket 46 which is fixed on stub shaft 26 which terminates at its upper end at a more or less frusto-conical shaped guide tongue 48 of reduced thickness so as to project through a vertical slot passing through at least the mid-section of the knock-off head 18. The knock-off head can, for example, be constructed of two matching side sections 47, 47′ united in spaced apart relation so as to define a vertical slot 49 (Fig. 2) for penetration by tongue 48, each such side section carrying its own rigid knock-off finger. Below tongue 48, bracket 46 has increased thickness, thereby forming opposed shoulders 52 (only one of which is visible in the drawing) and knock-off head 18 is thus supported for horizontal reciprocating movement on bracket 46 generally horizontally along a path fixed by tongue 48. A tension spring 54 stretches between tongue 48 and head 18 to bias the latter toward the left in Fig. 1.

The end of knock-off head 18 opposite to fingers 22, 22′ is affixed to the end of a rigid knock-off rod 56 which at its opposite end is pivoted to the control handle 59, usually referred to as the "shipper" handle 59, of the loom, the connective arrangement being such that the solid line position of the knock-off head corresponds to the "on" or operating position of the operating handle. In this particular case shown, the shipper handle 59 occupies "on" position when pivoted clockwise and "off" position when swung counterclockwise, and the pivot axis of the handle itself, therefore, lies above the point of pivotal connection of the knock-off rod 56 thereto.

The arrangement just described operates in the following manner: While the loom is operating normally, the actuating levers 14, 14′ of the respective stop solenoids 10, 10′ remain in depressed position so that knock-off head 18 likewise occupies a depressed normal operating position shown in solid lines in Fig. 1. As the crankshaft 36 rotates, each of the cams 34, 34′ turns 360° during each weaving cycle and causes each of the rocker arms 28, 28′ to oscillate back and forth in timed relation to such rotation. The hammers 30, 30′ thus are consequently displaced to and fro in relation to the corresponding knock-off fingers, but as long as the knock-off head remains depressed or disabled, hammers 30, 30′ pass freely above the upper limits of fingers 22, 22′ without contacting the same, and the weaving continues without interruption. When, however, either a weft or warp yarn breaks, the control signal generated by the corresponding conventional breakage detecting means is applied to the corresponding stop solenoid which actuates its armature to pivot the corresponding actuating lever upwardly. This lifts the corresponding lift rod 16, 16′ thereby pivoting the knock-off fingers 22, 22′ connected thereto upwardly into the oscillating path of the associated hammer 30, 30′. Then, as the cam shaft continues to turn, the rocker arms will be rocked in their turn toward the corresponding knock-off finger so as to impact against such finger in its upwardly displaced position, creating a mechanical impulse which is transmitted to knock-off head 18 and through rod 56 to the loom shipper handle driving it to its "off" position, causing the loom to stop.

Since each of cams 34, 34′ corresponds in function to a particular type of defect, either warp breakage or weft breakage, and since the relative positions of the cams on the crankshaft can be adjusted, it becomes possible to control the timing of the knock-off action selectively to match the needs of the particular kind of defect. Such adjustment will naturally have to be made on a loom by loom basis; the driving mechanism of each different type of commercial loom has its own peculiar braking time constant and the effect of inertia will to some extent be different for each given loom but by observing the inertia and the braking time constant of a specific loom, the respective cams 34, 34′ can, by trial and error, be arranged on crankshaft 36 so that they result in the loom coming to a halt at the proper points in its operating cycle for the defects in question. In the course of repairing a defect, the defect sensing means will be returned to its normal operating position, and the respective stop solenoids are reset to their operating position, thereby returning the knock-off head to its depressed or disabled normal operating position before the shipper handle is pivoted to restart the loom. It should be stated that the peripheral displacement of cams 34, 34′ seen in Fig. 1 is selected primarily to distinguish between the two cams and is not intended to represent actual illustrative operating positions thereof which would in any case have to be tailored to the particular loom, as already stated.

It can be added, however, that in general, the

optimum stopping point for purposes of repair of a filling defect is at approximately 200—210° of the cycle, while for a warp defect, the best stopping position is around 320° of rotation, keeping in mind in the latter case the need for the lay to be sufficiently removed from front dead center as to minimize the chance of a set-mark.

The combined stop motion of the present invention is also ideally adapted to utilization in furnishing the loom with the capability for single-pick operation, i.e. the insertion of a single weft and then coming automatically to a halt. To this end, one of the stop solenoids 10, 10', preferably the weft solenoid 10 for reasons to be explained shortly, is connected through a flip-flop 60 and a manual pushbutton switch 62 to a source of control current 64. When pushbutton 62 is closed either just before or simultaneously with movement of the shipper handle 59 to "on" position, flip-flop 60 is activated so as to actuate the stop solenoid 10 which causes the knock-off head 18 to be lifted to an enabling position with one of its knock-off fingers in position to be engaged by a knock-off hammer during the immediately following cycle of the loom. The flip-flop 60 can be reset in any convenient way and, for sake of illustration, the extreme lower end of the shipper handle is provided with a magnetic tip 66 which is adapted to cooperate with a magnetically attractable switch 68, such as a Hall effect switch, situated adjacent the path of the shipper handle end when the latter is in its full "off" position. Thus, when the stop motion functions to knock-off the loom due to actuation of the stop solenoid, the movement of the shipper handle to its off position automatically resets flip-flop 60 in readiness for the next cycle.

Given the fact that the loom stops fairly late in its cycle in the event of the occurrence of a defective pick or warp breakage, stoppage of the loom within the same cycle wherein the defect occurs would impose enormous stress on the loom components and consequently, it is intended in the practice of the present invention for the inertia of the loom to carry its operating components, especially the lay, well into the subsequent cycle, stopping at one of the predetermined points therealong as specified above. This means, of course, that when a filling defect has occurred, the defective pick has already been beat up into the fabric and the heddles have shifted position for the insertion of the following pick which has already been inserted across the open shed. In order to repair the defect pursuant to this invention, the inserted weft for the next cycle is removed by hand, the loom having been brought to a stop in position appropriate for such removal. Next, the heddles must be returned to the position occupied by them when the defective pick was inserted and the single pick operation feature of the present invention enables this to be done by mere actuation of the single pick control by the loom attendant. The heddles are thereby reversed, opening the shed to enable the defective pick to be removed without interference. In the meantime, a fresh pick has been inserted into the shed opened by reversal of the heddles and the lay has been positioned ready to resume the normal weaving operation. In order to minimize the opportunity for set-marks to be created when the loom is restarted, it is preferred that the weft stop solenoid be integrated into the single pick operation, receiving the control signal from the flip-flop 60 and thereby stopping the loom in the vicinity of 200—220° of its cycle, which is ideal for eliminating set-marks.

A further consideration involved in the selection of the stopping point of the loom following single-pick operation as well as for a weft defect, is the effect of the stopping point on the manipulation of the weft itself. While the system of the present invention can be employed quite successfully with conventional commercial looms of all types, it is also especially useful in association with a loom of the fluid insertion type, and while various different looms operating in this way have been or are being designed, and all can in principle utilize the system of the invention with good results, a particular preferred fluid weft insertion loom is disclosed and claimed in application Serial No. 64,180 filed in the name of Charles W. Brouwer et al on August 6, 1979, and commonly assigned herewith, to the description of which reference may be had for a fuller understanding of its operation. In the loom of application Serial No. 64,180, air or other inert compressible medium is delivered under predetermined pressure to the throat of an insertion nozzle and an important feature of that loom is the manner in which the flow of air to the nozzle is controlled to limit the duration of the air flow in the manner of a pulse, the pressure of the air in this pulse being sufficiently high that this pulse contains all of the energy necessary to transport a typical yarn across the width of a typical commercial loom, say at least about 48". Because of this high air pressure, the weft yarn passing through the nozzle throat for insertion thereby into the warp is subjected to very substantial stress, particularly since the preferred nozzle of the above-identified application is designed to impart supersonic velocities to the air flow downstream of its throat and the yarn is exposed to such high velocities.

It has been found that if the yarn is exposed to such intense air flow when it is being restrained against movement, either before or after its insertion into the loom shed, the stress upon the stationary yarn will be deleterious to that yarn. For this reason, the stopping point of the loom must be coordinated with the timing of the pulse or other flow of the weft insertion medium so as to avoid stopping the loom, while the pulse control device remains substantially operative. Damage to the yarn is minimized, however, if the earliest stopping point of the loom is subsequent to termination of the pulse of weft inserting medium; although in practice, some overlap is permissible provided the pulse is in its terminal phase at that point and is already undergoing a loss in pressure on the way towards imminent shutdown.

There is another advantage of the system of the invention which is of significant merit in actual commercial practice. The stopping positions of the heddles of the loom, which typically project in their open or spread position vertically well above the body of the loom and thus are readily visible at some distance, are different with the two kinds of defects in question, the heddles stopping in closed or together position for a warp defect and in well separated or open condition for a weft defect. Hence, simply by observing the position of the heddles, the operator is immediately informed as to the kind of defect which requires attention and may, therefore, organize the approach to be taken for repair to minimize wasted time and effort.

The location of the present stop motion on the loom frame is obviously subject to some variation. As mentioned above, the driving cams are preferably mounted directly on the loom crankshaft, which might influence its location, but this is not essential because the cams could be mounted elsewhere and driven in synchronism with the crankshaft by means of intermediate gearing, a timing belt coupling or the like. One useful location is adjacent the inside of the side frame member nearest the shipper handle (which is usually actuated at front corner but well clear of the paths of movement of operating components, such as the heddles and lay) to avoid interference therewith. The instant system obviously takes up relatively little space since the axial thickness of its individual elements, and therefore the overall axial thickness, need only be such as to achieve the required mechanical strength and durability for long term operation.

From the foregoing it will be seen that the present invention provides unique and advantageous method and apparatus for stopping a loom upon detection of a warp or filling defect with the various mechanisms of the loom, particularly the lay and harnesses, in the optimum position for correction of a warp or filling defect. In practice with the prior art the repair of filling defects is a laborious and time-consuming task. For example, in effecting such repairs on conventional fly shuttle looms it has been necessary, once the loom is stopped, for the loom attendant to rotate the loom crankshaft backwards manually to relocate the lay and other operative loom components at a desired starting position to avoid the set-mark problem. Next, the operator is required to remove the faulty pick. Thereafter, the operator grasps and holds the filling end from the bobbin in the shuttle with one hand while manually propelling the shuttle through the shed to insert a "good" pick in the shed for beat-up.

In clear contradistinction to the foregoing, the present invention operates upon the detection of a faulty pick to stop the loom automatically on the next cycle after the faulty pick has been beat into the fabric. This stopping, as previously mentioned, occurs when the loom is approximately 270° into the next cycle. When the loom is thus stopped the operator manually removes the pick then resident in the shed as fully explained prior cited U.S. patent application Serial No. 64,180. At this point, since the heddles must be returned to the positions they were in when the faulty pick was inserted into the fabric, that is, the heddles must be reversed to permit ready removal of the faulty pick. This is achieved by actuating pushbutton 62 which automatically operates the loom through one cycle with the loom stopping at approximately the 200—220° position. In the course of this single pick operation of the loom the shed is reversed to permit easy manual removal of the faulty pick from the fabric while, at the same time, causing a fresh pick to be inserted into position in the shed. Additionally, the loom mechanisms are optimally positioned to beat up the further pick once the loom is restarted with the lay impacting against the further pick under its full operating force to thereby preclude a set-mark in the fabric at the locus where the filling repair has been made. Therefore, filling repairs as just described can be effected some three or more times faster in practice with the present invention than is possible with prior art techniques while, at the same time, avoiding undesirable set-marks in the woven fabric.

While a preferred embodiment of the invention has been described, with various preferred aspects being identified, it will be understood and appreciated that the invention is not intended to be limited in its scope to these preferences as other alternatives and options will be readily available within the skill of the art and will be obviously suggested by what has been specifically described and illustrated. Therefore, the invention is not intended to be confined in its scope to any specific characteristics except where expressly required by the accompanying claims.

CLAIMS

1. A method of weaving a fabric in which a loom is driven in a repetitive cycle to insert a weft yarn between separated groups of warp yarns to form the fabric, which comprises deriving signals on breakage of the weft yarn or any of the warp yarns from transducer means responsive to said breakages and applying said signals to stop said loom at such times that said loom is stopped in different positions for warp and weft breakages.

2. In a yarn stop motion for a loom having a driving means for driving the same in a repetitive cycle to insert a weft yarn between separated groups of warp yarns to form fabric and including separate detection means for detecting the occurrence of a breakage in the weft yarn or in any of the warp yarns, an improved combined warp and filling stop motion effective to stop the loom drive in different positions within its cycle corresponding to the type of yarn breakage, which comprises:

— a pair of impacting means each mounted for independent movement to and fro along a fixed path;

— separate drive means for the respective

impacting means, each such drive means being driven from said loom driving means in individually adjustable predetermined timed relation to the loom cycle.

— loom control means operatively connected to the loom drive means and movable between a normal loom running position and a loom stopping position;

— impact transmitting means operatively associated with said control means and displaceable between a retracted position outside the paths of both said impacting means to a projected position within both said paths to receive when in said projected position the impact of the respective impacting means and transmit such impact to said control means to move the same to its loom stopping position; and

— separate actuating means for said impact transmitting means responsive to each of said weft detecting means to cause displacement of said impact transmitting means to its projected position in the event of the activation of the corresponding detecting means, whereby the response of the combined stop motion to either warp or weft breakage is delayed according to the predetermined timing of the corresponding drive means for a period which can be adjusted to cause stoppage of the loom at different positions for the two types of yarn breakage.

3. A stop motion according to claim 2 wherein said actuating means for said transmitting means comprises two separate solenoids, one connected to said warp detecting means and the other to said weft detecting means, each such solenoid having its armature linked to said impact transmitting means to displace the same upon its actuation.

4. A stop motion according to either of claims 2 or 3 including a separate impact transmitting means for each of said impacting means.

5. A stop motion according to any one of claims 2 to 4 wherein said impact transmitting means comprises a generally horizontally movable rod connected at one end to said loom control means and carrying at its other end two individually displaceable fingers receiving the impact when displaced from the corresponding impacting means.

6. A stop motion according to any one of claims 2 to 5 wherein said drive means for said impacting means comprises a pair of cams driven in synchronism with the loom operating cycle, each such cam having high and low regions on its periphery, and said impacting means includes follower means engaging the periphery of the corresponding cam to achieve a to-and-fro movement in synchronism with the loom cycle, the relative peripheral positions of the high and low regions of said cams being different with respect to said loom operating cycle whereby the respective impacting means are driven at different points along said cycle.

7. A stop motion according to claim 5 wherein said cams are mounted for individual adjustment relative to the loom cycle to permit the timing of the corresponding impacting means to be varied.

8. In a yarn stop motion for a loom having a driving means for driving the same in a repetitive cycle to insert a weft yarn between separated groups of warp yarns to form fabric and drive means being adapted to be halted upon delivery thereto of a control impulse and including separate detection means for detecting the occurrence of a breakage in the weft yarn or in any of the warp yarns, an improved combined warp and filling stop motion effective to stop the loom drive in different positions within its cycle corresponding to the type of breakage, which comprises:

— two separate means for generating separate control impulses in timed relation to the operative cycle of said driving means at different predetermined points in said cycle;

— impulse transmitting means operatively extending between said impulse generating means and said loom drive means in normally disabled condition; and

— means operated in response to detection by either of said detection means of breakage in one of said yarns for placing said inpulse transmitting means in enabled condition to transmit said control impulse to said loom drive and cause stoppage of the loom in position corresponding to the timing of said impulse generating means.

9. A yarn stop motion for a loom, substantially as hereinbefore described and illustrated by reference to the accompanying drawing.

10. A method of weaving a fabric substantially as hereinbefore described and illustrated by reference to the accompanying drawing.

11. A woven fabric when produced by a method in accordance with claim 1 to claim 10.

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